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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

William D. Ramsden, et al

ASCORBIC ACID COMPOUNDS AS REDUCING AGENTS FOR THERMALLY DEVELOPABLE COMPOSITIONS AND IMAGING MATERIALS

Serial No. 10/764,704

Filed 26 January 2004

Group Art Unit: 1752

Examiner: Walke, Amanda C.

I hereby certify that this correspondence was sent by facsimile transmission to the United States Patent and Trademark Office on the date set forth below.

Sherryl A. Payne

February 15, 2006
Date

Commissioner for Patents
P.O. Box 1450
Alexandria, VA. 22313-1450

Sir:

PRE-APPEAL BRIEF REQUEST FOR REVIEW

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Claims 1-31 have been rejected as under 35 U.S.C. 103(a) as unpatentable over U.S. Patent 6,440,649 (Simpson et al.) or 6,573,033 (Simpson et al.) in view of FR 1,542,505 (Ohkubo et al., identified as "Masuta" in the Office Action, corresponding to U.S. Patent 3,927,889) and JP 02-048659 (Taguchi).

The Final Rejection alleges that each of the Simpson et al. patents describes X-radiation sensitive photothermographic materials containing phosphors. These materials, known as "dry silver" materials further comprise a photosensitive catalyst, non-photosensitive source of reducible silver ions, reducing composition, and a hydrophobic or hydrophilic binder. The Final Rejection alleges the usefulness of fluorescent intensifying screens with the photothermographic materials but fails to cite relevant prior art. The Final Rejection also admits that the Simpson et al. patents are silent as to Appellants' specific ascorbic acid derivatives as reducing agents.

"Masuta" is cited as teaching photothermographic silver halide films containing silver benzotriazole and a "reducing agent meeting the instant claim limitations", a binder, and a photosensitive silver halide (preferably silver bromide and/or iodide). The Final Rejection (page 4) is confusing, however, in that is states that "Masuta" anticipates the "instant claims", yet the rejection is over obviousness.

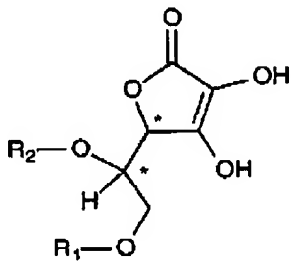
Taguchi is cited for disclosing a thermally developable photosensitive material comprising a binder, photosensitive silver halide (AgBrI), a dye/reducing agent that "meets the instant claim limitations", and a tetrazole compound.

Appellants' Invention:

The reduction of the silver ions in silver benzotriazole to silver metal in photothermographic materials generally requires a relatively strong reducing agent. A typical developer is ascorbic acid that is known to provide useful photospeed, adequate Dmax, and low Dmin. Derivatives (such as esters) of ascorbic acid have also been described in the art as reducing agents for silver ions in organic silver salts. For example, ascorbic acid palmitate, dipalmitate, stearate, myristate, and laurate are described in the art for this purpose.

However, since these compounds have been disadvantageous for one reason or another, there has been continuing work in the art to develop other strong reducing agents for aqueous-based thermally developable materials using silver benzotriazole. Because some imaging systems include components that may lead to image instability, especially in aqueous-based imaging materials, there has also been a continuing need to find the most suitable silver ion reducing agents to improve post-processing light stability of the imaged materials.

Appellants have found that a specific class of reducing agents provides improved post-processing print stability of images in aqueous-based, thermally developable compositions and materials containing silver salts such as silver benzotriazole. These reducing agents are compounds represented by the following Structure (I):



(I)

wherein R_1 and R_2 are independently hydrogen or an acyl group having 11 or fewer carbon atoms, provided that at least one of R_1 and R_2 is an acyl group.

Appellants have demonstrated that these compounds provide improved results over the use of ascorbic acid (see Applicants Examples 1 and 2, pages 46-57 with data in TABLES III and IV). The data demonstrate an advantage especially for the improvement in post-processing print stability ("Light Box Test" in TABLE III and the reduced change in Dmin shown in TABLE IV).

To further demonstrate that the results from use of the ascorbic acid derivatives of Structure (I) are unexpected over the teaching of the prior art, Appellants tried to use a conventional ascorbic acid derivative, 1-ascorbyl palmitate in the same manner. A **Rule 132 Declaration** ("Declaration 1") presented with Appellants' response dated August 23, 2005 by co-Appellant James Philip, Jr. provides evidence that this compound of the prior art could not be dissolved and is thus useless in an aqueous-based thermally developable composition according to the present invention. This disadvantage is not apparent from the teaching in the art (especially "Masuta").

In addition, Appellants presented another **Rule 132 Declaration** ("Declaration 2") with their response dated January 12, 2006 in which Dr. Philip carried out the same experiments and attempted to use the laurate, myristate, and stearate esters of ascorbic acid, as taught in "Masuta", in aqueous-based formulations. None of these esters could be dissolved and are thus also useless in the practice of the presently claimed invention.

Thus, Appellants evaluated four of the ascorbic acid esters suggested in "Masuta" as reducing agents for photothermographic materials and found that they were

not useful in the aqueous-based formulations necessary for the presently claimed invention. Yet, Appellants have found a unique class of ascorbic acid derivatives that are unexpectedly useful in the aqueous-based compositions and materials of the presently claimed invention to improve post-processing print stability. The use of this particular class of ascorbic acid esters is highly unpredictable in view of this consistent showing of unexpected results over prior art compounds.

Rebuttal of Final Rejection:

The Examiner admits that the primary references of Simpson et al. fail to teach the use of critical ascorbic acid derivatives of the present invention as reducing agents. Moreover, neither Simpson et al. reference is directed to the problem of improved "post-processing" print stability of the resulting black-and-white images.

Appellants respectfully submit that neither "Masuta" nor Taguchi supplies the missing teaching. Moreover, the combined teaching fails to teach or suggest the presently claimed aqueous-based, black-and-white photothermographic materials containing the critical ascorbic acid derivatives as reducing agents. The Final Rejection alleges that the combined teaching would suggest the claimed invention to improve sensitivity/speed, but this it not the problem addressed by the present invention.

Appellants respectfully point out that "Masuta" fails to direct a skilled artisan to aqueous-based photothermographic materials and compositions. The only teaching about formulations and binders is found in the Examples (TABLE 1) where polyvinyl butyral is used as the binder and the formulation was prepared and coated out of an organic solvent. This is descriptive of organic-solvent based photothermographic materials not aqueous-based materials.

More importantly, this reference teaches the use of a number of higher alkyl ascorbic acid esters such as 1-ascorbyl palmitate, laurate, myristate, and stearate, as reducing agents. As pointed out by Dr. Philip in both Declarations 1 and 2, these compounds cannot be used in the present invention. None of these esters would dissolve in water even when heated at 55°C and with application of sonic energy for one half hour. In contrast, when the same premix was prepared using a molar equivalent amount of 1-ascorbyl pivalate (Compound I-1 of the invention), complete dissolution occurred at 55°C with sonic energy. Additionally, the esters of "Masuta" would not dissolve in a mixture of 50% water and 50% methanol even when the mixture was heated at 40°C (Declaration 2). In contrast, Appellants' 1-ascorbyl pivalate was soluble in such a mixture. Because of the unpredictable properties of such chemical compounds, a skilled worker would not therefore be motivated by "Masuta" to use Appellants' specific class of reducing agents of Structure (I) because similar compounds taught in "Masuta" are worthless for the present invention.

Appellants have not tried just one compound suggested by "Masuta" but the three specific esters evaluated in TABLE 1 and a fourth ester (stearate ester) that is also within the scope of the formulae in Col. 3. They have taken the preferred esters of "Masuta" and demonstrated that they are useless in the practice of the presently claimed invention. This is clearly a good faith, sufficient, and unrefuted effort to demonstrate unexpected results under Section 103.

The Examiner suggests that "Masuta" is relied upon for its "teachings that ascorbic compounds are employed in any photothermographic material as reducing agents." Appellants don't deny that there are possibly hundreds of publications generally describing the use of ascorbic acid compounds as reducing agents in various photothermographic materials. "Masuta" is clearly one of such publications.

However, Appellants have consistently pointed out that there are various classes of ascorbic acid derivatives, such as classes of esters, known in the art. "Masuta" teaches the use of certain classes of such esters, and mentions three particular ones in the examples. Appellants have also clearly pointed out that those preferred compounds (as well as the stearate ester) are not useful in the presently claimed invention that includes aqueous-based photo thermographic materials (and formulations required to make them). Only Appellants' compounds of Structure (I) are found to be useful in these types of materials.

Appellants would not have expected this to be the case in view of the teaching in "Masuta" that is quite general and broad in concept but once the compounds taught in "Masuta" were found to be failures, Appellants realized how unpredictable and difficult it is to find suitable ascorbic acid derivative reducing agents.

Taguchi is no better for supplying the missing teaching. It is directed to "color" media. In view of the different chemistry and chemical mechanisms used for color and black-and-white imaging materials, one skilled in the art would not even consult Taguchi to solve a problem of light instability in black-and-white photothermographic images.

Thus, the secondary references cited in the Final Rejection fail to direct or motivate a skilled artisan to use Appellants' unique class of reducing agents that solve the noted post-processing print instability problem in aqueous-based photothermographic materials, particularly in view of their unrefuted showing of unexpected results that is evidence of unpredictability in this particular art.

While Appellants dispute the assertion that a *prima facie* for obviousness has been made with the combination of "Masuta" and/or Taguchi with either Simpson et al. reference, even if that position is conceded, Appellants have effectively rebutted it with a clear and convincing showing of unexpected results that has not been given the proper probative weight in evaluating patentability. Thus, it is believed that the Section 103 rejection should be withdrawn.

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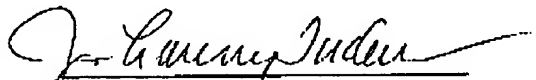
Respectfully submitted,



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If the Examiner is unable to reach the Applicant(s) Attorney at the telephone number provided, the Examiner is requested to communicate with Eastman Kodak Company Patent Operations at (585) 477-4656.